CLAIMS

What is claimed is:

1. A global positioning system (GPS) receiver system, comprising:

a GPS clock that is calibrated to GPS time when the GPS receiver system is navigating using GPS satellite data, wherein the GPS clock is configured to be turned off when the GPS receiver system is not navigating;

a real time clock (RTC) that uses significantly less power than the GPS clock, wherein the RTC is configured to keep time when the GPS clock is turned off;

a brownout detection circuit coupled to the RTC, wherein the brownout detection circuit is configured to,

receive an RTC clock signal;

detect a loss of RTC clock cycles; and

output an RTC status signal that indicates a loss of RTC clock cycles above a predetermined threshold.

2. The GPS receiver system of claim 1, wherein the brownout detection circuit comprises:

a detection circuit that receives the RTC clock signal and determines whether the RTC clock is losing cycles, wherein the detection circuit is calibrated to determine whether a loss of cycles is above the predetermined threshold; and

a status circuit that stores a signal output by the detection circuit and outputs a status signal indicating the RTC clock is one of GOOD and NOT GOOD.

3. The GPS receiver system of claim 2, wherein the detection circuit comprises a resistor-capacitor (RC) time constant component with a predetermined time constant, wherein the RC time constant component receives the RTC clock signal and outputs a decayed voltage, wherein a level of the decayed voltage indicates whether the loss of cycles is above the predetermined threshold.

4. The GPS receiver of claim 3, further comprising a navigation processor coupled to receive the status signal, wherein the navigation processor determines whether to use the RTC clock for acquisition of satellites based on the status signal.

5. The GPS receiver system of claim 4, further comprising an edge aligned ratio counter (EARC) coupled to the RTC and to the GPS clock, wherein, on start-up of the GPS receiver system for satellite acquisition, time kept by the RTC clock is transferred to the GS clock using the EARC, and wherein the transferred RTC time is used for acquisition if the status signal indicates the RTC is GOOD.

6. A system for global positioning system (GPS) navigation comprising:

a baseband chip; and

a radio frequency (RF) chip, wherein the RF chip and the baseband chip are coupled through an interface, and wherein the RF chip comprises:

a GPS clock that is calibrated to GPS time when the GPS receiver system is navigating using GPS satellite data, wherein the GPS clock is configured to be turned off when the GPS receiver system is not navigating;

a real time clock (RTC) that uses significantly less power than the GPS clock, wherein the RTC is configured to keep time when the GPS clock is turned off; and

a brownout detection circuit coupled to the RTC, wherein the brownout detection circuit is configured to detect a loss of RTC clock cycles.

7. The system of claim 6, wherein the RF chip further comprises:

a temperature sensor coupled to the RTC; and

an analog to digital (A/D) converter coupled to the temperature sensor.

8. The system of claim 7, wherein the baseband chip comprises:

a navigation processor coupled to receive signals from the RF chip through the interface, including an RTC status signal that indicates whether the RTC clock signal should be used for satellite acquisition;

an edge aligned ratio counter (EARC) coupled to receive a GPS clock signal and the RTC clock signal and configured to align respective GPS and RTC clock signals with a high degree of accuracy, and to transfer time kept by the RTC clock to the GPS clock; and

a memory device coupled to the A/D converter and to the RTC, and configured to store a table relating temperature to frequency for the RTC clock.

9. The system of claim 7, wherein the brownout detection circuit comprises:

a detection circuit that receives the RTC clock signal and determines whether the RTC clock is losing cycles, wherein the detection circuit is calibrated to determine whether a loss of cycles is above the predetermined threshold; and

a status circuit that stores a signal output by the detection circuit and outputs a status signal indicating the RTC clock is one of GOOD and NOT GOOD.

10. The system of claim 9, wherein the detection circuit comprises a resistor-capacitor (RC) time constant component with a predetermined time constant, wherein the RC time constant component receives the RTC clock signal and outputs a decayed voltage, wherein a level of the decayed voltage indicates whether the loss of cycles is above the predetermined threshold.

11. The system of claim 7, wherein the interface comprises a serial peripheral interface.

12. The system of claim 8, wherein the navigation processor sends a command via the interface to the brownout detection circuit requesting a status of the RTC, and wherein the brownout detection circuit responds by sending an RTC status via the interface.

13. A system for global positioning system (GPS) navigation comprising:

a radio frequency (RF) chip, wherein the RF chip comprises a GPS clock that is calibrated to GPS time when the GPS receiver system is navigating using GPS satellite data, wherein the GPS clock is configured to be turned off when the GPS receiver system is not navigating; and

a baseband chip, wherein the baseband chip and the RF chip are coupled through a system interface, and wherein the baseband chip comprises,

a real time clock (RTC) that uses significantly less power than the GPS clock, wherein the RTC is configured to keep time when the GPS clock is turned off; and

a brownout detection circuit coupled to the RTC, wherein the brownout detection circuit is configured to detect a loss of RTC clock cycles.

14. The system of claim 13, wherein the baseband chip further comprises:

a temperature sensor coupled to the RTC; and

an analog to digital (A/D) converter coupled to the temperature sensor.

15. The system of claim 14, wherein the baseband chip further comprises an edge aligned ratio counter (EARC) coupled to receive a GPS clock signal and the RTC clock signal and configured to align the respective clock signals with a high degree of accuracy, and to transfer time kept by the RTC clock to the GPS clock.

16. The system of claim 15, wherein the baseband chip is coupled to a processor and a memory through a peripheral interface, wherein:

the memory device is coupled to the A/D/ converter and to the RTC, and is configured to store a table relating temperature to frequency for the RTC clock; and

the processor is configured to receive signals through the peripheral interface, including an RTC status signal that indicates whether the RTC clock signal should be used for satellite acquisition.

17. The system of claim 13, wherein the brownout detection circuit comprises:

a detection circuit that receives the RTC clock signal and determines whether the RTC clock is losing cycles, wherein the detection circuit is calibrated to determine whether a loss of cycles is above the predetermined threshold; and

a status circuit that stores a signal output by the detection circuit and outputs a status signal indicating the RTC clock is one of GOOD and NOT GOOD.

18. The system of claim 17, wherein the detection circuit comprises a resistor-capacitor (RC) time constant component with a predetermined time constant, wherein the RC time constant component receives the RTC clock signal and outputs a decayed voltage, wherein a level of the decayed voltage indicates whether the loss of cycles is above the predetermined threshold.

19. The system of claim 13, wherein the system interface comprises a serial peripheral interface.

20. The system of claim 16, wherein the processor sends a command via the peripheral interface to the brownout detection circuit requesting a status of the RTC, and wherein the brownout detection circuit responds by sending an RTC status signal via the peripheral interface.

21. An apparatus for detecting a loss of clock cycles in a clock signal generating device, the apparatus comprising:

a detection circuit that receives the a clock signal from the clock signal generating device, and determines whether the clock signal generating device is losing cycles, wherein the detection circuit is calibrated to determine whether a loss of cycles is above the predetermined threshold; and

a status circuit that stores a signal output by the detection circuit and outputs a status signal indicating the clock signal generating device is one of GOOD and NOT GOOD.

22. The apparatus of claim 21, wherein the detection circuit comprises a resistor-capacitor (RC) time constant component with a predetermined time constant, wherein the RC time constant component receives the clock signal and outputs a decayed voltage, wherein a level of the decayed voltage indicates whether the loss of cycles is above the predetermined threshold.

23. The apparatus of claim 22, wherein:

the status circuit comprises a latch device; and

the detection circuit further comprises a voltage comparator coupled to latch device, wherein the voltage comparator compares the decayed voltage and a reference voltage and outputs a result signal that resets the latch when the loss of cycles is above the predetermined threshold.

24. A method of determining a status of a real time clock (RTC) in a global positioning system (GPS) receiver, the method comprising:

receiving an RTC clock signal in a detection circuit;

detecting when the RTC is losing clock signals such that the loss of clock cycles is above a predetermined threshold;

storing the status of the RTC, wherein the status is one of GOOD and NOT GOOD;

if the loss of clock cycles is above the predetermined threshold, setting the status of the RTC to bad; and

before using the RTC clock signal for acquiring satellites, checking the status of the RTC.

25. The method of claim 24, wherein detecting comprises receiving the RTC clock signal in a resistor-capacitor (RC) circuit with a calculated RC time constant such that when the loss of clock cycles is above the predetermined threshold, an output voltage of the RC circuit decays below a predetermined level.

26. The method of claim 25, wherein storing the status comprises storing a status bit based on the output voltage level of the RC circuit, wherein a first logic value of the status bit indicates GOOD and a second logic value of the status bit indicates "bad.

27. The method of claim 26, further comprising, on start-up of the GPS receiver, setting the status bit to indicate GOOD during an interval when the RTC is powering up.

28. The method of claim 27, further comprising:

on start-up of the GPS receiver, transferring time kept by the RTC to a GPS clock using an edge aligned ratio counter (EARC);

checking the status of the RTC; and

if the status of the RTC is GOOD, using the transferred time to acquire satellites.